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REMARKS

This Amendment is in response to the Final Office Action mailed March 26, 2002. Claims 1-15 and 21-26 are pending in the application and have been rejected. Applicants have amended the claims to correct informalities and respond to the rejection of claims 1-15 and 21-26 as follows.

Response to rejection of claims 1-15 under 35 U.S.C. § 112

Claims 1-15 were rejected under 35 U.S.C. § 112, Second Paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Applicants have amended claims 1 and 2 to recite assembly components throughout and respectfully request reconsideration and withdrawal of the rejection under 35 U.S.C. § 112 therefor.

Claim 3 was rejected on the basis that the phrase "the carousel coupling device", lines 1-2, does not have antecedent basis. Claim 3 depends from claim 2 which depends from claim 1 which recites a carousel coupling device to removably coupled a component carousel including a plurality of assembly components to the carousel base which provides antecedent basis for the recitation of "the carousel coupling device" in dependent claim 3. Reconsideration and withdrawal of the rejection of claim 3 under 35 U.S.C. § 112 are respectfully requested.

Claim 21 was rejected based upon the phrase "the unassembled device". Claim 21 has been amended to recite an unassembled device and reconsideration and allowance thereof are respectfully requested.

Response to rejection of claims 1 and 21 under 35 U.S.C. § 102(b) based upon Fix Sr., U.S. Patent No. 5,606,153

Claim 1 was rejected as being anticipated by Fix on the basis that Fix teaches an assembly arm 104 and an assembly driver 102 coupled to the assembly arm. To establish a prima facie case

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for rejecting a claim under 35 U.S.C. § 102(b), each of the claim limitations must be expressly or inherently taught by the prior art reference. Claim 1 recites *inter alia* an assembly arm and a driver coupled to the assembly arm, a carousel base rotationally coupled to the frame and a carousel coupling device to removably couple a component carousel to the carousel base. In the apparatus of the present invention, the component carousel can be removed from the carousel base for restocking which provides advantages over prior devices. The Examiner's rejection of claim 1 contains no reference to the portion of the claim reciting a carousel base rotationally coupled to the frame and a carousel coupling device as recited in the claim. Accordingly, Applicants respectfully request that the rejection of claim 1 be withdrawn and that each of the recited claim limitations be considered as a basis for determining patentability of the claim.

Claim 1 recites *inter alia* that the driver moves the assembly arm between the carousel base and an unassembled data storage device to sequentially unload assembly components from the component carousel and assemble the unloaded assembly components into a data storage device. Claim 1 was rejected on the basis that Fix operates assembly arm 104 to unload components 109 and load components in the unassembled device 108 and assemble the unloaded components into the data storage device (whole station assembly 106) and further that filter is substantially equal to the broadly claimed "data storage device".

Claim 1 recites that the driver moves the assembly arm to assemble the unloaded components into the data storage device which the Examiner states is equivalent to item or filter 107. However, the Examiner has not rejected claim 1 on the basis that Fix teaches assembling unloaded components into filter or item 107 which the Examiner states is equivalent to the data storage device. As recited in claim 1 driver moves an assembly arm to sequentially unload (or remove) a plurality of components from a

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component carousel and the component carousel removably couples to the carousel base which is not taught nor suggested by the unloadable sample holders 109 on carousel 111 of Fix. Reconsideration and allowance of claim 1 are respectfully requested.

Similarly claim 21 was rejected as being anticipated by Fix on the basis that Fix discloses an assembly arm and an assembly arm driver. Claim 21 is a means-plus-function claim which recites *inter alia* an assembly arm, an assembly arm driver and a means for intermittently stocking the assembly apparatus with a supply of components for assembly by the assembly arm. Means-plus-function language in a claim must be interpreted to include the corresponding structure disclosed in Applicants' specification and equivalents. Claim 21 was rejected on the basis that Fix teaches an assembly arm and an assembly arm driver without regard or consideration of the means-plus-function limitation recited in the claim which as previously discussed is interpreted to include the corresponding structure disclosed in Applicants' specification and equivalents.

As described in Applicants' specification, assembly components are stored on carousels removably coupled to the frame so that components can be loaded without interrupting operation of the apparatus. In one embodiment, assembly components include discs housed by carousels 158-1, 158-2 which are removably coupled to the frame of the apparatus so that the carousels may be loaded with components for assembly without interrupting operation of the machine. Disc carousels 158-1, 158-2 removably support a plurality of disc magazines 174 for increased capacity. As shown, filled disc magazines may be loaded onto disc carousels 158-1, 158-2 without unloading discs from prepackaged magazines 174. As shown, multiple carousels 158-1, 158-2 allow the apparatus to continue to operate while an empty carousel is reloaded with filled disc magazines. As described, the recited means provides

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removable carousels for stocking the carousel with components for assembly by the assembly arm.

Claim 21 was rejected without consideration of the means-plus-function limitation in the claim and without consideration of the scope of the means-plus-function limitation. Reconsideration and allowance of claim 21 over Fix based upon consideration of the recited means-plus-function limitation and interpretation of the corresponding structure are respectfully requested.

Response to rejection of claims 2-5 under 35 U.S.C. § 103(a) based upon Fix and Tokisue

Claims 2-5 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Fix in view of Tokisue, U.S. Patent No. 5,077,888 on the basis that it would have been obvious to one having skill in the art to incorporate a motor and a vacuum source as taught by Tokisue onto the invention of Horning. As best understood claims 2-5 are rejected based upon Fix and Tokisue and not Horning and accordingly Applicants respectfully request reconsideration and withdrawal of the rejection of claims 2-5 on the basis that it would have been obvious to one having skill in the art to incorporate a motor and a vacuum source as taught by Tokisue onto the invention of Horning.

Claims 2-5 are dependent upon claim 1 which recites *inter alia* a carousel base and a carousel coupling device to removably couple a component carousel to the carousel base which as previously discussed is not taught nor suggested by Fix, nor the further combination of Tokisue. Claims 2 further recites a motor coupled to the carousel base which was rejected on the basis that Tokisue teaches a spindle motor 4 coupled to the carousel base 6. Reference number 6 of Tokisue relates to a pallet for delivery of device 5 along a roller conveyor 7 which does not teach or suggest a carousel base rotationally coupled to a frame as recited in claim 1 including a coupling device to removably couple a

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component carousel to the carousel base and the further limitation of claim 2 reciting a motor coupled to the carousel base.

Claim 3 as amended recites that the carousel coupling device includes a vacuum source which was rejected on the basis that Tokisue teaches a vacuum source 22, 74 operatively associated with a base 1,6. As illustrated in Tokisue vacuum source grips workpiece or disc 1 for assembly in a disc device 5 or workpiece. Fix discloses a gripper arm having gripping fingers for manipulating a filter 107, holder 109 or workpiece for removal or reinsertion. Thus, the combination of Fix and Tokisue teaches a vacuum gripper for a workpiece or component and does not teach or suggest a coupling device to removably secure a component carousel to a rotatable carousel base as claimed nor the further limitation of claim 3.

Claim 4 further recites an indexer and claim 5 further recites a carousel including a plurality of component containers configured to contain a plurality of assembly components and the carousel including a plurality of latch assemblies to removably secure the plurality of containers which allows the component carousel to be restocked without significant handling or delay. Claims 4 and 5 were rejected without consideration of each of the recited claim limitations and Applicants respectfully request that the rejection of claims 4-5 based upon Fix and Tokisue be withdrawn for failure to establish that the combination of references teaches each of the recited claim limitations.

Response to rejection of claims 6-10 under 35 U.S.C. § 103 based upon Fix and Tokisue

Claim 6-10 were rejected under 35 U.S.C. § 103 as being unpatentable over Fix in view Tokisue. Claims 6-10 similarly are dependent upon rejection claim 1 which, as previously discussed, is not obvious over the combination of Fix and Tokisue.

Claim 6 further recites a plurality of carousel bases

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rotationally coupled to the frame. A driver moves an assembly arm between the multiple component carousels to unload multiple component carousels on the plurality of carousel bases which has advantages over prior assemblies since the assembly or assembly arm shifts between component carousels so that a component carousel can be removed and restocked while assembly operation continues unloading a second carousel which is not taught nor suggested by the prior art.

Claims 6 was rejected on the basis that it would have been obvious to one having ordinary skill in the art to provide a number of carousel bases since duplication of working parts involves only routine skill in the art without reference to each of the recited claim limitations. Claim 6 recites a plurality of carousel bases and a driver that moves the assembly arm between multiple component carousels on the carousel bases which provide more than a mere duplication of parts but allows the assembly arm to shift between multiple carousels while an empty carousel is restocked to limit interruption in the assembly process. Applicants respectfully request reconsideration of claim 6 based upon each of the recited claim limitations as required.

Claims 7-10 are dependent upon claim 1 and were rejected without regard to the specific claim limitations recited in dependent claims 7-10. For example, claim 8 further recites a carousel including a plurality of spaced latched assemblies about a circumference to removably connect a plurality of disc containers which is not taught nor suggested by the combination of references cited. Claim 9 is dependent upon claim 8 and further recites disc containers including covers and a cover detacher to detach the covers which is not taught nor suggested by the combination of Fix and Tokisue. Applicants respectfully request reconsideration and allowance of claims 7-10 based upon consideration of the recited claim limitations.

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Response to rejection of claims 22 under 35 U.S.C. § 103 based upon Fix, Tokisue and Hutchins

Claim 22 was rejected under 35 U.S.C. § 103 as being unpatentable over Fix in view of Tokisue and further in view of Hutchins, U.S. Patent No. 4,835,711. Claim 22 is dependent from claims 1 and 6 which, as previously discussed, are not obvious over the combination of Fix and Tokisue. Claim 22 was rejected on the basis that Hutchins teaches a sensor for positioning a workpiece relative to a work station 104. Claim 22 recite *inter alia* a detector and a controller which is configured to shift operation of the assembly arm between carousel bases based upon feedback from the detector. Hutchins does not teach or suggest a detector and a controller to shift operation of the assembly arm from one of multiple carousels to another of the multiple carousels based upon feedback from the detector as recited in amended claim 22. The combination of Fix, Tokisue and Hutchins teaches a sensor for aligning the robotic arm relative to a work station and does not teach or suggest the sensor for shifting operation of the assembly arm as claimed.

Response to rejection of claims 23-26 under 35 U.S.C. § 103 based upon Fix and Sabel

Claims 23-26 were rejected under 35 U.S.C. § 103 as being unpatentable over Fix in view of Sable, U.S. Patent No. 4,481,752. Claim 23 has been amended to recite a plurality of carousel bases rotationally coupled to the frame and rotatable about spaced rotation axes and an assembly driver coupled to the assembly arm to operate the assembly arm between the plurality of carousel bases which is not taught nor suggested by the combination of Fix and Sable. Claims 23-26 were rejected on the basis that it would have been obvious to provide a plurality of assembly arms on the invention of Fix as recited in the Office Action. Claims are examined based upon claim limitations recited in the claims. Claims 23-26 do not recite a plurality of assembly arms and thus

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rejection of claim 23-26 based upon the fact that Sable teaches a plurality of assembly arms is irrelevant where the combination of references does not teach or suggest each of the claim limitations recited in the amended claims.

Claims 24-26 further recite subject matter which is not taught nor suggested by the combination of Fix and Sable. Claim 24 recites a plurality of disc unloaders and the assembly arm is operable between the plurality of disc unloaders and the carousel bases are coupled to an elevator to position sequential discs relative to the disc unloaders which is not taught nor suggested by the recited combination. Claim 25 is dependent upon claim 23 and recites a plurality of disc carousels including a plurality of disc containers and claim 26 further recites that the disc containers are removably supported by a plurality of latch assemblies which is not taught nor suggested by the cited references. Claim 26 was rejected on the basis that Fix discloses disc containers 111 however, claim 26 is dependent upon claim 23 and recites a plurality of carousel bases including a plurality of carousels supported thereby and the plurality of carousels including a plurality of disc containers which is not cumulatively taught by carousel 111 of Fix.


Based upon the foregoing, Applicants respectfully request consideration of each of the recited claim limitations of the rejected claims and allowance of the rejected claims over the cited references or entry of the proposed claim amendments to place the claims in better form for appeal to simplify the issues for appeal.

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The Director is authorized to charge any fee deficiency required by this paper or credit any overpayment to Deposit Account No. 23-1123.

Respectfully submitted,

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MARKED-UP VERSION OF REPLACEMENT CLAIMS

1. (Thrice Amended) An apparatus for assembling components of a data storage device comprising:

- a frame;
- a carousel base rotationally coupled to the frame;
- a carousel coupling device to removably couple a component carousel including a plurality of assembly components to the carousel base;
- an assembly arm movably coupled to the frame; and
- a driver coupled to the assembly arm to move the assembly arm between the carousel base and an unassembled data storage device to sequentially unload ~~individual~~ the plurality of assembly components from the component carousel and assemble the unloaded assembly components into the data storage device.

2. (Thrice Amended) The apparatus of claim 1 wherein the component carousel supports a plurality of stacks of the plurality of assembly components at spaced locations arranged about a center point and the apparatus comprises:

- a motor coupled to the carousel base to rotationally position ~~each~~ the plurality of stacks of assembly components for assembly.

3. (Thrice Amended) The apparatus of claim 21 wherein the carousel coupling device comprises a vacuum source operably coupled to the rotatable carousel base to supply vacuum pressure in an engaged mode to secure the component carousel to the carousel base and to release the vacuum pressure to remove the carousel.

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4. (Thrice Amended) The apparatus of claim 2 further comprising an indexer coupled to the carousel base to align individual components from the plurality of stacks of the plurality of assembly components relative to the assembly arm.

5. (Thrice Amended) The apparatus of claim 2 and including a ~~carousel coupled to the carousel base and a plurality of elongated components container configured to contain a~~ the plurality of assembly components and the carousel includes a plurality of latch assemblies to removably secure coupleable to the plurality of containers carousel and positionable at spaced locations about a rotation axis of the carousel base.

6. (Thrice Amended) The apparatus of claim 1 wherein the apparatus includes a plurality of carousel bases rotationally coupled to the frame and a plurality of carousel coupling devices to removably support multiple component carousels relative to the plurality of carousel bases and the driver moves the assembly arm between the multiple component carousels on the plurality of carousel bases to unload the multiple carousels on the plurality of carousel bases.

7. (Thrice Amended) The apparatus of claim 1 ~~and further wherein~~ the component carousel comprises a disc carousel removably coupled to the carousel base and adapted to support discs for assembly in a spindle motor of a the data storage device.

9. (Amended) The apparatus of claim 8 wherein the plurality of disc containers include covers and the apparatus includes a cover detatcher to detach the disc container covers prior to assembling discs from the plurality of disc containers.

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10. (Thrice Amended) The apparatus of claim 1 ~~and further wherein~~ the component carousel comprises a spacer carousel adapted to support spacers for assembly in a spindle motor of a data storage device.

11. (Thrice Amended) The apparatus of claim 1 wherein the apparatus is adapted to assembly components of a disc stack ~~supported by~~ of a spindle motor and further comprising:

- a plurality of carousel bases including a carousel base adapted to support a component carousel for discs and a carousel base adapted to support a component carousel for spacers;
- a plurality of assembly arms including an assembly arm coupled to the carousel base supporting the component carousel for discs to assemble ~~the discs~~ and an assembly arm coupled to the carousel base supporting the component carousel for spacers to assemble ~~the spacers~~;
- a plurality of drivers coupled to the plurality of assembly arms to move the plurality of assembly arms between the plurality of carousel bases and a loading station; and
- a controller coupled to the plurality of drivers ~~of the assembly arm~~ to coordinate operation of the plurality of assembly arms to alternately assemble the discs and the spacers.

12. (Thrice Amended) The apparatus of claim 11 wherein the component carousel for ~~the discs~~ includes a frame including a plurality of circumferentially spaced latch assemblies to removably couple a plurality of disc containers to the carousel.

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13. (Thrice Amended) The apparatus of claim 12 wherein the disc containers house a ~~disc stack including a plurality~~ of coaxially aligned unassembled discs and further comprises an indexer to incrementally position the carousel base ~~removably supporting adapted to support~~ the carousel for discs to sequentially unload individual discs in the ~~disc stack~~ of unassembled discs.

14. (Thrice Amended) The apparatus of claim 11 wherein the component carousel for spacers includes a base including a plurality of spacer posts arranged about a center point and sized to support a plurality of stacked spacers and including a motor coupled to the carousel base adapted to support the component carousel for spacers to move the carousel for spacers to align ~~sequential~~ stacks of the plurality of stacked spacers for assembly.

15. (Thrice Amended) The apparatus of claim 14 further comprising an index rod operably coupled to the component carousel for spacers to push the spacers towards an extended end of the spacer posts for assembly.

21. (Twice Amended) An assembly apparatus comprising:
an assembly arm and assembly arm driver operably coupled to the assembly arm to operate the assembly arm to unload components from the assembly apparatus and load components in ~~the~~ an unassembled device; and
means for intermittently stocking the assembly apparatus with a supply of the components for assembly by the assembly arms.

22. (Amended) The apparatus of claim 6 wherein the apparatus includes a detector to detect when the multiple component carousels are empty and the assembly arm is coupled to a

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controller which is configured to shift operation of the assembly arm from one of the multiple carousels to another of the multiple carousels supported on the plurality of carousel bases based upon feedback from the detector.

23. (Amended) An assembly apparatus comprising:

a frame;

a plurality of carousel bases rotationally coupled to the frame and rotatable about spaced rotation axes;

an assembly arm movably coupled to the frame;

an assembly arm driver coupled to the assembly arm to operate the assembly arm to unload components from carousels coupled to the plurality carousel bases; and

a controller operably coupled to the assembly arm and configured to sequentially operate the assembly arm between the plurality of carousel bases.

25. (Amended) The apparatus of claim ~~24~~ 23 including a plurality of disc carousels removably coupled to the plurality of carousel bases and the plurality of disc carousels removably support a plurality of disc containers including a plurality of stacked discs.